LIST

LONG ISLAND SINCLAIR TIMEX GROUP
INCORPORATING * NYTSE OF NEW YORK CITY
ISSUE: **September** 1990

* NEW YORK TIMEX SINCLAIR ENTHUSIASTS: NEXT MEETING OCT. 14 1990

DISK DRIVES SUPPORTED:
1 OLIGER
2 LARKEN
3 AERCO

LIST MEMBERSHIP IS $15.00. LIBRARY TAPES ARE AVALIABLE, WRITE THE ADDRESS PRINTED BELOW.

Conversion tips

TIMEX GRAPHICS
Phone Line Filter
SPEECH
TIMEX LOGIC, PART II

L.I.S.T.
5 PERI LANE
VALLEY STREAM, NY
11581

LAMB310 524043037 1990 09/27/90
NOTIFY SENDER OF NEW ADDRESS
LAMBERT
1301 KIBLINGER PL
AUBURN IN 46706-3010

TO:

Don Lambert JAN/91
3310 Clover DR SW
Cedar Rapids, IA
52404

FIRST CLASS MAIL
DATED MEETING NOTICE

UPPER RIGHT CORNER OF YOUR LABEL IS DATE OF LAST ISSUE.

LIST OFFICERS

PRES.	HARVEY RAIT
TRES.	ROBERT MALLOY
COR.SEC.	JOHN PAZMINO
EDITOR.	FRED STERN
LIBR.	TOM SKAPINSKI

PLEASE SEND INQUIRIES TO:
LIST
MR. HARVEY RAIT
5 PERI LANE
VALLEY STREAM, N.Y. 11581
PLEASE SEND SUBMISSIONS TO:
LISTING
MR. FREDERIC STERN
214 ROBERTS ST.
HOLBROOK, N.Y. 11741

NYTSE

NYTSE MEETS THE MONDAY AFTER THE LIST MEETING AT,
MISS KIMS RESTAURANT
PARK AVENUE SOUTH
BETWEEN 21 ST. AND 22 ST.
MEETINGS START 7:30 PM.

COMING EVENTS:

OCT. 14, 1990 LIST MEETING
OCT. 15, 1990 NYTSE MEETING

MEETING MINUTES SEPT. 16, 1990

HARVEY CALLED THE MEETING TO ORDER AT 2:00PM.

FORMER MEMBER GEOFFREY LEVY CONTACTED HARVEY REGARDING T/S EQUIPMENT HE HAD FOR SALE. THE MEMBERSHIP VOTED TO BUY MR. LEVYS EQUIPMENT. FRED TO PICK-UP THE EQUIPMENT.

LIST ORGANIZER AND FIRST PRESIDENT PAUL DONNELLY SENT US A LETTER DURING THE SUMMER. PAUL IS MOVING UP-STATE FOR BUSINESS REASONS, AND IS SELLING EQUIPMENT BEFORE THE MOVE. SEE PAGE 4 FOR HIS ITEM LIST.

THE SECOND PRINTING OF ZX-81 AND TS1000 TECHNICAL TIDBITS IS READY FOR SALE. IT CAN BE PURCHASED AT MEETINGS, OR BY MAIL EXCLUSIVELY THROUGH LIST. SEE THE AD. ON PAGE 3.

MYLES COHEN TOLD US ABOUT A MESSAGE HE HE SAW ON COMPUSERVE ABOUT A NEW I.C. CHIP DEVELOPED BY SIR. CLIVE. MYLES MADE A HARDCOPY WHICH WILL BE EXCERTED IN THE NEXT LISTING.

JOHN PAZMINO ANSWERED 3 LETTERS DURING THE SUMMER, AND DEVELOPED A NEW APPLICATION FORM AND INFORMATION COVER LETTER TO BE SENT TO PEOPLE WHO ENQUIRE ABOUT LIST.

WE EXTEND OUR CONDOLENSES TO STONEY MCMURRAY ON THE PASSING OF HIS MOTHER DURING THE SUMMER. STONEY INFORMED US THAT HIS SON EUGENE MADE HIGH SCORES IN A CITY WIDE NINTENDO COMPETITION DURING THE SUMMER.

OTHER BUSINESS

WE ARE LISTED IN THE USER GROUP SECTION OF COMPUTER MONTHLY.

MEMBERS HAVE BEEN ABLE TO BUY PARTS FOR TS2068 FROM:
DAN ELLIOT, RT.1, BOX 117,
CABOOL, MO. 65689.

CLASSIFIEDS

THIS CLASSIFIED SECTION IS AVAILABLE TO ALL LIST MEMBERS FREE OF CHARGE.
THE ONLY RESTRICTION IS THAT IT IS TO BE USED ONLY FOR THE SEEKING, SELLING OR SWAPPING OF SINCLAIR, TIMEX OR MICROACE COMPUTER EQUIPMENT, PERIPHERALS AND SOFTWARE.
LISTING, LIST, AND ITS OFFICERS DO NOT ENDORSE, WARRANTY, OR GUARANTEE ANY OF THE ITEMS LISTED IN THIS CLASSIFIED SECTION

IF YOU HAVE A COPY OF Q-SAVE, FOR THE TS1000 PLEASE CONTACT FRED STERN 516-737-0983.

SEE PAUL DONNELLYS LIST ON PAGE 4.

A FINAL WORD

MY NAME IS FRED STERN AND I AM THE EDITOR OF THIS EDITION OF LISTING.

THANK YOUS TO TOM SKAPINSKI, WARREN FRICKE, AND PAUL DONNELLY FOR CONTRIBUTIONS TO THIS EDITION.

OUR ARTICLE BANK IS RUNNING LOW, PLEASE CONTRIBUTE NEWSWORTHY ARTICLES AND HELP SUPPORT YOUR SINCLAIR-TIMEX NEWSLETTER.

SEE YOU ALL AT THE NEXT MEETING.

ZX-81 AND TS1000
TECHNICAL TIDBITS
SECOND PRINTING

TIMEX sinclair 1000

ZX-81 AND TS1000

TECHNICAL TIDBITS

Long Island Sinclair-Timex Group

$4.00

Hardware

Last Chance Sale: by Paul Donnelly. Call 261-6934. All items are as is, where is, but all worked last time I had them out of the box!

New; TS1000..Complete in original carton w/all original cable, etc. $10.00

TS1016.. 16K Ram Pack $ 5.00

Used; for TS1000

Aerco Disk Drive System.. Includes motherboard, power supply and disk drive. Also nearly a dozen disks full of software. $95.00

Zebra Light Pen $ 5.00

Parrot Voice Synthesizer for TS1000, with software, and special phoneme program. Unit as described in Syntax and Sync Magazines, uses chips sold by Radio Shack, and used in other systems. Will work on TS 2068, but you have to write your own software(it can be done in BASIC). $10.00

Oliger interface system. motherboard(3-slot), and EPROM read and write boards. $11.00

Byte Back interface. Has eight REAL Relays to tie your TS1000 into the real world. Software provided. $10.00

Both TS1000 & 2068:
Timex MODEM, original equipment, complete, but without case. software(Mterm) available.. $ 5.00

Used TS2068:

TS2068 Color Computer Complete , in factory carton, with all original equipment, AND INSTALLED Romswitch for Spectrum compatibility. 51.00

Zebra Voice Synthesizer, with software. Probably works with TS1000, also, but would need software. $10.00

Software

Used Cassettes(who knows whats on'em) $ 0.05
With case, add .05
TS1000 Cassettes ..Brand new, no choice of titles, use for PERFECT data tapes(to choose titles $0.25 ea) $ 0.10
TS2068 cassettes, and Spectrum software $ 1.00
TS2068 Cartridges $ 2.00
Books: various interfacing, programming, etc. $ 1.00

Special!

Printer!!!!

Centronics 101 printer with test board, spare ribbon, and starter supply of paper. Wide carriage, uppercase only(Just perfect for TS1000), parallel type interface(Centronics established the standard printer, used even by IBM today) required. This printer is in operating conndition. It weighs over 100 lbs., and is built like a rock. You'll need a space about 30" by 24" for it though.
You pick up! $20.00

Paul Donnelly
261-6934

TIMEX LOGIC, PART II

In the preceding chapter we learned that logic is number oriented, and that conditions which are TRUE are replaced by the computer with a logic value of 1, and conditions which are FALSE are replaced by a logic value of 0. Program lines with statements containing a single logic condition usually present no problem to understand, either to devise when creating a program, or to determine their effect in one that is already existing.

But there are numerous occasions where two or more conditions must be acted upon jointly before the computer can take proper action. This is done by appropriately connecting the logic conditions with the logic operators, AND and OR.

AND can be likened to connecting two logic conditions in series, so that both conditions must be considered, one and then the other, before proper action can be taken. Such a statement might appear as.....

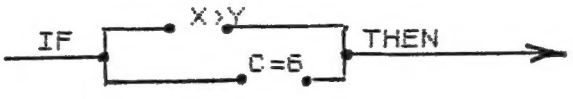
```
IF X>Y AND C=6 THEN....
```

In a diagram arrangement this same statement can be shown as....

In such a diagram we might consider computer functioning to be similar to the flow of current in an electrical circuit. The two conditions might then be analogous to switches in the circuit, closed if a condition is TRUE and open if it is FALSE. So visually, this diagram shows that AND requires both conditions to be TRUE for current to flow and the THEN action to take place.

OR, in a statement, can be likened to connecting two logic conditions in parallel so that if either condition is TRUE, its branch conducts and the THEN action takes place. Such a statement and its corresponding diagram might look like the following example.....

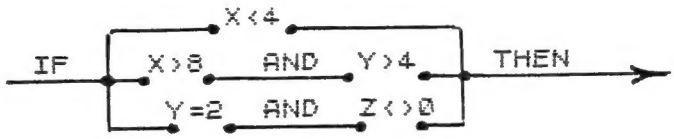
```
IF X>Y OR C=6 THEN....
```



Statements may become more complex than these, but no matter how many logic conditions there may be, such a statement may always be diagramed by groupings of series and parallel circuits. The resulting diagram will be relatively easy to analyze. Where both AND and OR conditions occur in a statement, connect the AND conditions first as AND has a higher priorty than OR. Consider the following statement.....

```
IF X<4 OR X>8 AND Y>4 OR Y=2
      AND Z<>0 THEN.....
```

This line would be diagramed by first connecting the AND conditions into series branches and then connecting the various branches in parallel. It would end up like.....

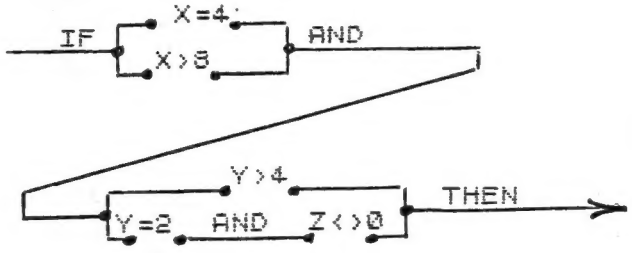


From this diagram one can readily see that the THEN action will take place if any one of the three branches contains nothing but TRUE conditions, regardless of the status of the other two branches. For example, if X is equal to 3 (refer to the top branch), the THEN action occurs.

Parentheses, having a high priorty of 16, will affect the logic of a statement in which they appear. Priorty requires that the computer consider them first and the resulting diagram should show this. Insert some parentheses at random into the previous statement and it might look like.....

```
IF (X<4 OR X>8) AND
   (Y>4 OR Y=2 AND Z<>0) THEN..
```

Connecting the elements within the parentheses first, we get this diagram.....



Now it should be apparent at a glance that there are 4 paths by which current can flow; thus four possible combinations of conditions that will produce a THEN action.

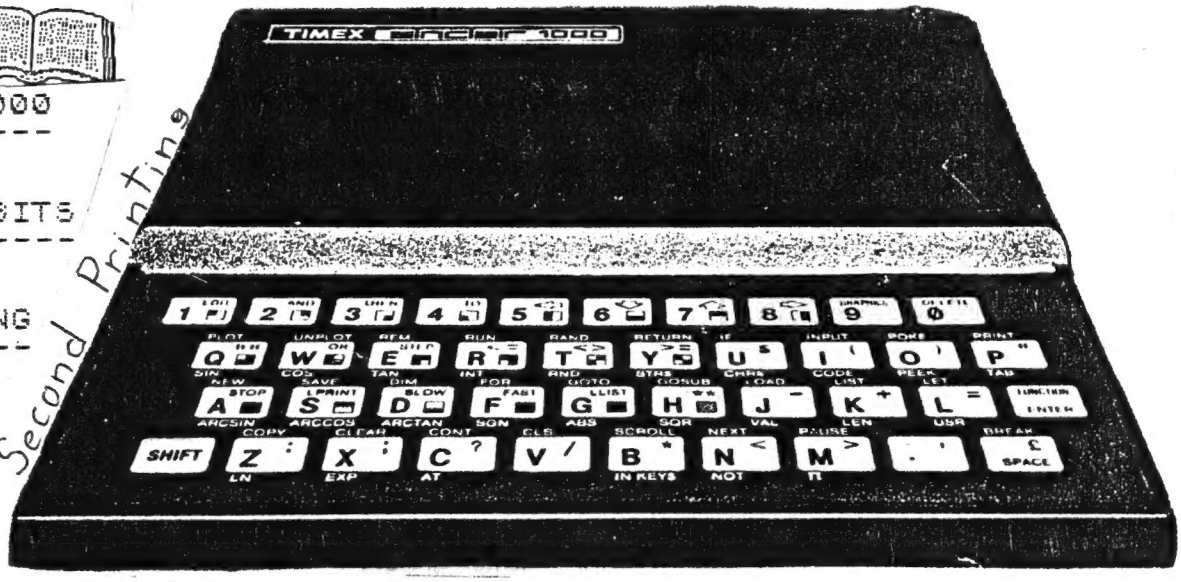
In the use of diagrams, one can work backwards from a diagram to produce a statement of logic that will cover any conceivable set of conditions. It can be of considerable help to a programmer. It eliminates uncertainty and guess work, and perhaps the need for a lot of trial and error testing.

Although we used numerical conditions throughout these illustrations (because they need less space to show), conditions containing STRING$ are very common and can also be TRUE or FALSE. They would form diagrams in a similar manner. Later in this series we will encounter some.

This might be as good a place as any to inject a word of caution when using a condition such as Y=2 in the preceding statement. If the value of the variable Y is to be computed by the program, it may show up with a value of say 1.99999999, depending upon the factors used and the arithmetical operations which produce it. The computer does not consider such a value to be equivalent to 2, in a comparison. So you might want to write the condition as..... INT(Y+.1)=2, or what ever else might be needed to avoid a faulty comparison.

In the next chapter, we will explore other Boolean logic arrangements, and some others besides these that are uniquely Timex.

Warren Fricke
8-12-88



ZX-81 AND TS1000

TECHNICAL TIDBITS

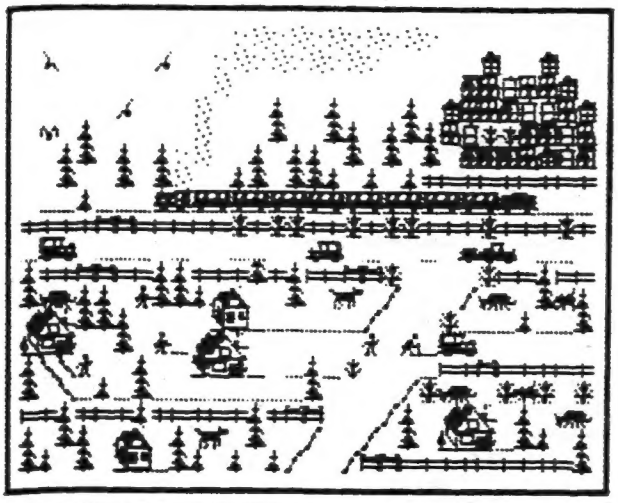
SECOND PRINTING

On Sale

$4.00

TIMEX GRAPHICS

Rois Harder



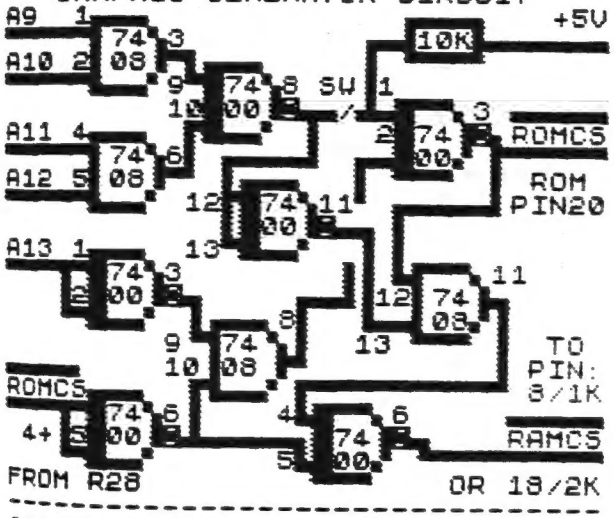
**** DIRECT KEYBOARD HI-RES ****

THIS CUSTOM-GRAPHIC CIRCUIT WAS TAKEN FROM SINCLAIR PROJECTS JAN.83 ISSUE.IT ALLOWS FOR USING THE COMPUTER/S ON-BOARD 1K OR 2K RAM FOR LOADING CUSTOM CHR$ OF YOUR OWN CHOOSING.

THIS MODIFICATION IS EASIER TO PERFORM ON A SOCKETED BOARD.

IT IS REQUIRED THAT YOU ALTER YOUR COMPUTER IN A WAY THAT WILL PREVENT IT/S NORMAL OPERATION UN LESS AN EXTERNAL RAMPAC IS USED.

GRAPHIC GENERATOR CIRCUIT



****** GENERAL INFORMATION *****

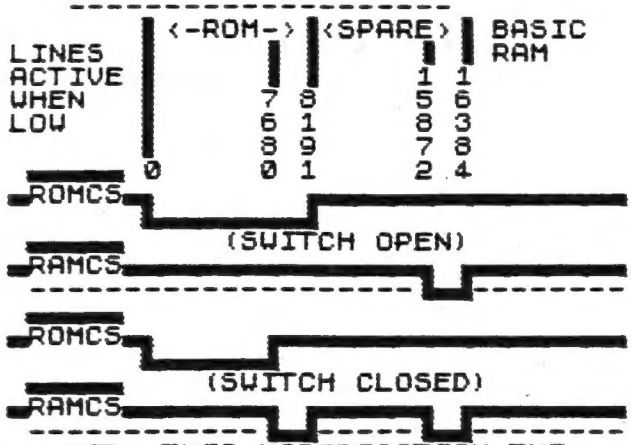
1.WITH A(NAND)GATE(74LS00), -ANY(0)IN = (1) OUT. (OR ALL (1)S IN = (0) OUT)

2.WITH AN(AND)GATE(74LS08), -ALL (1)S IN = (1) OUT. (OR ANY (0) IN = (0) OUT)

3.A BAR OVER A LEAD MEANS THAT LEAD IS ACTIVE LOW.

4.THE(ANDED)ADDRESS LINES A9, A10,A11,A12,ENABLE RAMCS FROM 15872 TO 16383.THE ROMCS IS ENABLED STILL,FROM 0-8191. A13 IS USED TO DISABLE THE ROM FROM 8K TO 16K.

5.RESULTANT MEMORY MAP:



WITH THIS MODIFICATION,THE LOGIC CHIP WILL ENABLE ROMCS FOR CHR$ READ IN THE 7680 LOCATION, BUT IF THE SWITCH IS OPERATED, THE RAM(15872 AREA)IS READ.

AS THE CIRCUIT IS WIRED IN SERIES WITH R28,THE ROM/S ROMCS LEAD (PIN 20) WILL FUNCTION NORMALLY,WITH THE SWITCH OFF,AS THE ROMCS OUTPUT MIRRORS THE ROMCS INPUT FROM THE ULA.

WITH THE SWITCH ON,THE RAMCS LEAD IS ACTIVE LOW INSTEAD,SO THAT THE"ON BOARD"RAM IS USED.

PARTS REQUIRED: 1-10K RESISTOR, 2-74LS00(NAND),1-74LS08(AND), 1-SPST TOGGLE SWITCH,WIRE,ETC.

INSTALLATION PROCEDURES:

1.BUILD THE CIRCUIT BOARD.

2.SEVER PIN 2A EDGE-CONNECTOR TRACK OF COMPUTER(RAMCS).

3.LIFT THE ROM SIDE OF R28 FOR INSERTING THE NEW CIRCUIT.

4.LIFT 2114 RAM IC/S FROM BOARD, BEND ADDRESS PINS A0-A8 UP,AND RE-INSERT THEM IN THE SOCKETS.

5.WIRE IC PINS OR TRACKS:

2114 OR 4118	ROM	ADDR.LINE
2	3	23	A8
3	4	1	A7
4	5	2	A6
17	23	3	A5
5	6	4	A4
16	22	5	A3
6	7	6	A2
15	1	7	A1
7	8	8	A0

IF YOU HAVE 2114 IC/S,LINK THEIR RESPECTIVE BENT OUT PINS TOGETHER.(2 TO 2,3 TO 3 ETC.)

JOIN THE 9 LEADS FROM THE NEW BOARD,AND MOUNT THE SWITCH.

6.TEST BY POWERING UP AND PROVE THAT THE COMPUTER WORKS NORMAL WITH THE TOGGLE SWITCH OFF. (WITH THE SWITCH OPERATED,THE

Conversion tips

A guide to ZX81/Spectrum program conversions from David Nowotnik.

The versions of BASIC offered by the two ZX computers are so similar that many programs for one can be used by the other. The ZX81 has only two commands which are not present on the Spectrum, SCROLL and UNPLOT, and these should cause you few problems when converting ZX81 programs to the Spectrum (see Table 1).

There are quite a lot of commands and functions on the Spectrum which are not available on the ZX81. A list of these appears in Table 4. The stars indicate those commands and functions for which there is no simple translation to ZX81 BASIC. Those for colour and sound can be ommitted; but you will have to find some alternative for the high resolution and file I/O commands.

The command PLOT appears on both computers, but the effect is quite different, so beware! Another tip: PEEK and POKE should be used with caution. In conversion, addresses will almost certainly have to be changed. Some of those changes appear in the tables. A command such as POKE USR "a". . . . on the Spectrum indicates User Defined Graphics; ZX81 users don't have this facility, so you'll have to omit this and use a standard character instead.

ZX81	Spectrum	Comments
SCROLL	RANDOMISE USR 3582 or LET t=USR 3582	If the program uses random numbers, they could become rather predictable with the first option. If so, use the second, using a variable (in this case t) which is otherwise not used.
PLOT Y,X	PRINT AT 21−Y/2,X/2;	Print the appropriate quarter square graphics character.
UNPLOT Y,X	PRINT AT 21−Y/2,X/2;	Print a space, or the appropriate quarter square graphics character.

Table 1 ZX81 to Spectrum conversions.

Spectrum	ZX81	Comments
BIN eg LET y=BIN 10010101	LET y=(decimal no.) Conversion to decimal: 10010101=149 128 64 32 16 8 4 2 1 Add these numbers together when a 1 appears at the appropriate position in binary.	BIN allows the representation of a number in binary. On the ZX81 use the decimal equivalent, but beware; BIN is often used with User Defined Graphics, which are not available on the ZX81.
READ/DATA eg READ x,y DATA 50,60	LET LET X=50 LET Y=60	READ and DATA are used to store a lot of information in a program. Use LET instead.
DEF FN and FN eg DEF a(x)=SQR x LET t=FN a(i)	LET X$="SQR X" LET X=I LET T= VAL X$	The defined function can appear in a string. Use the keyword for built-in functions (eg SQR). The equivalent of FN may need 2 lines, as shown.
PLOT	no equivalent	
SCREEN$ eg LET a=SCREEN$ x,y	LET A=PEEK(PEEK 16396 +256*PEEK 16397+1+Y+33*X)	Used in interactive games to detect characters in the display file. Note — this formula only works when a RAM pack is fitted.

Table 2 Spectrum to ZX81 conversions.

ZX81	Spectrum	Comments
1 FRAMES POKE 16436,255 POKE 16437,255	POKE 23672,0:POKE 23673,0	Both computers have a counter which accurately varies by 50 every second. In the example, use the first line to start the 'clock'. The variable T will have the time in seconds after the start. The counter can only be used for 10 minutes.
LET T=(65535-PEEK 16436-256*PEEK 16437)/50	LET t=(PEEK 23672+256*PEEK 23673)/50 For times greater than 10 minutes, you can use byte 23674 as well.	
2 Line number zero		
POKE 16510,0	POKE 23756,0 (As the start of BASIC can move, eg with microdrives) use with caution.	Converts the first line of a program to line number zero. which cannot be edited, and so is protected.
3 RAMTOP POKE 16388,X-256*INT (X/256) POKE 16389, INT (X/256)	CLEAR x	Creates a safe area at the top of RAM starting at address x, for storing data, machine code etc.

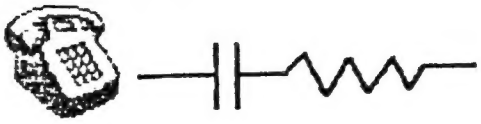
Table 3 General interconversion hints.

BEEP	*	FORMAT	*	ATTR	*
BORDER	*	INK	*	BIN	
BRIGHT	*	INVERSE		FN	
CAT	*	MERGE	*	IN	*
CIRCLE	*	MOVE	*	OVER	*
CLOSE	*	OPEN	*	POINT	*
DATA		OUT	*	SCREEN$	
DEF FN		PAPER	*	VAL$	*
DRAW	*	READ			
ERASE	*	RESTORE	*		
FLASH	*	VERIFY	*		

Table 4 Spectrum functions not available on the ZX81.

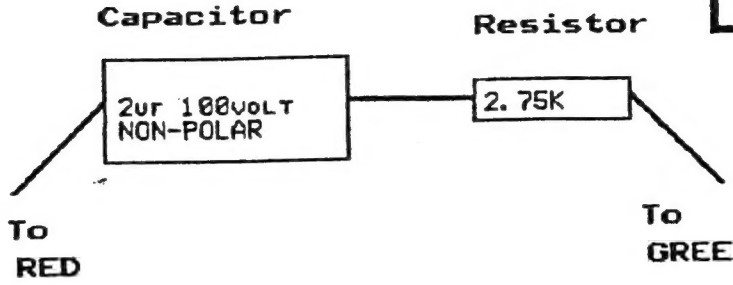
```
   SCREEN SHOULD FILL WITH PIXEL
   PATTERNS FROM THE CHR$ TABLE)
--------------------------------
NOW FOR THE PROGRAM 1: (LOADER)
TO RELOCATE THE ROM DOT PATTERNS
INTO CHR$ RAM AT LOCATION 15872.
    1 FAST
    5 LET A=15872
   10 FOR M=7680 TO 8191
   20 POKE A,PEEK M
   30 LET A=A+1
   40 NEXT M
   50 SLOW
--------------------------------
PROGRAM 2: (TO CHANGE CODE)
   10 PRINT "INPUT CHR$ CODE(0-63
)"
   20 INPUT C
   30 PRINT C
   40 PRINT "INPUT NEW CHR$ HEX C
ODES"
   50 LET M=15872+C*8
   60 FOR N=1 TO 8
   70 INPUT H$
   80 POKE M,16*(CODE H$(1)-28)+(
CODE H$(2)-28)
   90 PRINT AT 21,1;"=";H$
  100 LET M=M+1
  110 SCROLL
  120 NEXT N
(FOR EX: INPUT (1) FOR CHR$ CODE,
 AND THEN INPUT HEX CODES FOR A
 BIRD-00,40,20,10,10,3C,32,01)
  TO TEST.PRINT THE GRAPHIC 1
```

```
TO THE SCREEN,THEN OPERATE THE
SWITCH TO SEE THE NEW CHR$.
--------------------------------
PROGRAM 3: (TO CHANGE MORE CODE)
    1 FAST
    2 DIM(5,16)
    3 LET A$(1)="00402010103C3201
"
    4 LET A$(2)="CHR$ HEX CODE"
    5 LET A$(3)="CHR$ HEX CODE"
    6 LET A$(4)="CHR$ HEX CODE"
    7 LET A$(5)="CHR$ HEX CODE"
   20 FOR C=1 TO 5 (NO.OF A$)
   30 LET M=15872+C*8
   40 FOR N=1 TO 15 STEP 2
   50 LET H$=A$(C,N TO N+1)
   60 POKE M,16*(CODE H$(1)-28)+(
CODE H$(2)-28)
   70 LET M=M+1
   75 NEXT N
   80 NEXT C
   90 SLOW
--------------------------------
 COMBINE THESE PROGRAMS INTO 1
IF YOU LIKE,WITH A SUBROUTINE TO
CHANGE A PARTICULAR CODE,OR YOU
CAN USE PROGRAM 3 TO CHANGE THE
WHOLE KEYBOARD(A$(1)-(63)
--------------------------------
SUBMITTED   ROIS HARDER,
BY:         995 SHAKESPEARE AVE.,
            N.VAN.,B.C. V7K 1E7
--------------------------------
```

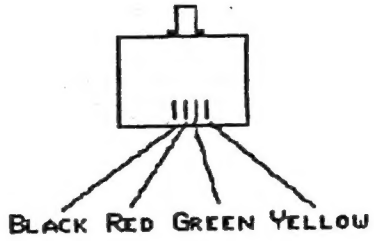


Phone Line Filter

by James G. DuPuy



From:
The Greater Cleveland
Sinclair Users Group
James G. DuPuy
6514 Bradley Ave. (Down)
Parma, Ohio, 44129



Modular Plug, Front view

Phone Line Filter

Have you ever been online to your favorite BBS and had bad blocks during file transfer or garbage characters appear on the screen for no reason? I have. In my case it seems to only happen on my favorite board, Free Net. I have also found it to happen only at 2400 baud. I called the manufacturer of my modem, Zoom Telephonics, and was told that since the problem seemed to be only with the one board, that it was more than likely due to line noise of some type. They gave me a suggestion that I tried and found to work GREAT! It is very simple and costs very little. (about $5.00)

All you need is a 2uf non-polar capacitor rated at 90+ volts and a 2.75K resistor 1/2 watt and a modular plug. These values are a bit out of the ordinary but you may combine values to come up with the right ones. I ended up putting 2 1uf caps in parallel to get the 2uf and 2 5.6K resistors in parallel to get 2.8K (close enough). The way it's wired is as follows: The capacitor (or combination) is connected in series with the resistor (or combination) and you are left with a lead from the cap and one from the resistor. These go to the RED and GREEN lines of the phone line. I just got a modular plug and connected them to the two pins in the center. The outer two leads are black and yellow. It does not matter if the resistor or cap lead goes to red. If you don't have a modular plug available, you can do one of two things. 1: Get an adaptor that has one male and two female. 2: Solder the leads in the modem where the red and green lines are connected. I would NOT advise doing the soldering in the modem since it will void the warranty. Most modems (internal and external) are packed pretty tight so adding parts can be tough, especially if you don't have much experience in electronics or soldering to high density PC boards.

Make sure that your leads are insulated so nothing can short! You can get a phone cord that your not using and cut it about 4 inches from the plug and strip off the outer insulation and use the red and green lines. This is what I did. Be sure that the plug will plug into the phone jack first! I believe the plug for the handset is different than the one that goes in the modem and the wall. To test it, plug it in then pick up the phone and be sure you get a dial tone and can dial. Also, be sure that you cover the whole thing up since there is normally 45 to 60 volts on an open phone line and up to 130 volts, 20 hertz AC during ring in.

Obviously don't try this if you know nothing about electronics! Also, you are at your OWN risk doing this. Please note also that if you don't insulate your connections and the phone line is shorted, You will be resposible when the phone man shows up to check your line and hands you the bill!

It did help in MY case. If you don't have a problem then DON'T use this. It seems to help primarily noisy lines. It won't help a bad modem or bad characters sent by either party. If you want further information, give me a call at: (216) 661-4105.

Listing 1.

```
10 LET T=0
20 FOR A=16514 TO 16866
30 INPUT X
40 POKE A,X
50 SCROLL
60 PRINT A,X
70 LET T=T+X
80 NEXT A
90 IF T<>32625 THEN PRINT
   "ERR
OR IN DATA";0
 100 FOR A=16867 TO 16912
 110 POKE A,70
 120 NEXT A
```

J N Creak gets into conversation with his ZX-81.

SPEECH

Listing 2.

```
   10 PRINT "PRESS ANY KEY TO CON
T."
   15 PAUSE 4E4
   20 RAND USR 16514
   25 PAUSE 4E4
   30 POKE 16542,104
   35 POKE 16566,128
   50 CLS
   60 RAND USR 16540
   70 IF INKEY$<>"" THEN GOTO 150
0
   80 FOR A=1 TO 50
   90 NEXT A
   95 GOTO 50
  100 GOSUB 3000
  105 GOSUB 1000
  110 PRINT "WHAT NAME ?"
  115 INPUT A$
  120 CLS
  130 POKE 16670,CODE A$
  140 POKE 16671,U-(
  150 POKE 16672,0+(
  160 LET A=INT (US
  170 IF A=1 THEN GOTO 2100
  180 IF A=2 THEN GOTO 2200
  190 RETURN
  200 GOSUB 3000
  205 PRINT "WHAT LETTER ?"
  210 INPUT A$
  215 CLS
  220 POKE 16670,CODE A$
  230 IF USR 16741<256 THEN GOTO
2300
  240 RETURN
  500 GOSUB 1000
  510 POKE 16542,103+0
  520 POKE 16566,104+U
  530 RETURN
 1000 PRINT "WHAT START (1 TO 24)
 ?"
 1010 INPUT 0
 1020 PRINT "AND END (1 TO 24) ?"
 1030 INPUT U
 1040 RETURN
 1500 IF INKEY$="T" THEN RUN
 1510 IF INKEY$="1" THEN GOSUB 50
0
 1520 IF INKEY$="S" THEN GOSUB 10
0
 1530 IF INKEY$="U" THEN GOTO 200
0
 1540 IF INKEY$="D" THEN GOSUB 20
0
 1550 GOTO 80
 2000 POKE 16542,104
 2005 GOSUB 3000
 2010 PRINT "ENTER LETTERS NOW"
 2015 CLEAR
 2020 DIM A$(25)
 2025 INPUT B$
 2030 CLS
 2035 LET A$=B$+" £"
 2040 IF USR 16670<256 THEN GOTO
2500
 2050 FOR A=1 TO 140
 2060 IF INKEY$<>"" THEN GOTO 240
0
 2070 NEXT A
 2080 GOTO 2040
 2100 PRINT "NO ROOM - MEM. FULL.
 ";"THINK AGAIN"
 2110 PAUSE 100
 2120 RETURN
 2200 PRINT "DATA LIST FULL.";" T
HINK AGAIN"
 2210 PAUSE 100
 2220 RETURN
 2300 PRINT "NO SUCH PHONEME: "
;A$;""""
 2310 PAUSE 100
 2320 RETURN
 2400 CLEAR
 2410 GOTO 2100
 2500 PRINT "PHONEME NAME NOT FO
ND"
 2510 PAUSE 100
 2520 GOTO 2100
 3000 PRINT "PHONEME:","LENGTH
 ";
 3010 LET A=PEEK 16673+256*PEEK 1
6674
 3020 IF A=16867 THEN GOTO 3050
 3030 FOR A=16867 TO A-3 STEP 3
 3040 PRINT TAB 2;CHR$ PEEK A;TAB
 14;PEEK (A+2)
 3050 NEXT A
 3060 PRINT
 3070 RETURN
```

USING THE excellent 48K Spectrum Speaks article in the June 1983 edition of *Your Computer*, it is possible to make an actual speech processor on a 16K ZX-81.

This program uses a "ZX-81isation" of that routine as its basis. Manipulation of the data is, however, made far easier.

The sounds can be stored and retrieved so that it is possible to construct whole sentences phonetically by joining together the stored sounds. 16K RAM is very limiting for the amount of data necessary to make useful speed possible, but the program uses it to its best possible advantage.

To enter the program first set RAMtop to 19712 in the usual way by:

```
POKE 16389,77
NEW
```

Next type in the hexadecimal loader program — listing 1 — and enter the machine code. When this is complete delete the loader program line-by-line and enter listing 2.

I suggest you now save it several times in case the machine code crashes when executed. A single error will generally cause a complete system reset, deleting everything, including any data above RAMtop.

Set up tape recorder

The next thing to do is to set up your tape recorder and ZX-81 as in figure 1. This works on the principle that almost all portable tape recorders have a monitor function during recording. This means that what is being recorded through the microphone can be put to an external loudspeaker or in this case to a computer. If you have no separate microphone but your tape recorder has a built-in one, then use that.

Set up the equipment, insert a fairly long blank tape — or one that can be overwritten — and start recording. Alternatively, you can play a recorded tape into the computer directly, without speaking, at about 1¼ times normal loading volume.

Set to Fast mode. Type Run and you will get a prompt. Decide what to say into the machine first, press Newline, and say it. If you make a mistake or over-run the time limit, hold down T when the prompt reappears. When it reappears for a second time it is ready to go again. If you have said the word correctly, just press Newline. The TV screen

(continued from previous page)

should then show a black screen with small white lines, which are the speech. If not, no sound is reaching the computer, in which case, check everything and rerun by pressing T.

Assuming the lines are there, disconnect the equipment and reconnect as in figure 2. An external loudspeaker is usually only necessary with tape recorders with built-in microphones. If Record is again actuated then the voice — or other sound — should be heard. If not, you have equipment problems.

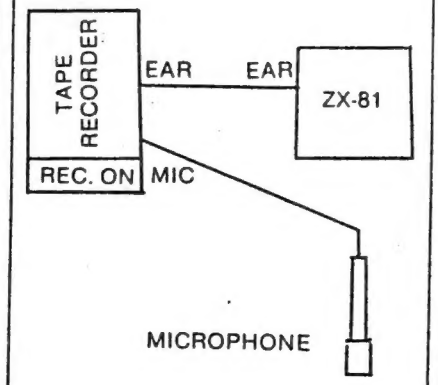
Once this stage is reached, one can move on to the more interesting aspects of the program. The complete sound input can be divided into 24 parts and they can be used singly or in groups, for hearing, storing and retrieving.

Press 1. You will be asked for a start-part — 1 to 24 inclusive is allowed. The end-part is similar but must be more than or equal to the start-part. If the end is the same then only that one part is output. Narrow down the parts, by inputting smaller and smaller sections of the sound, until you only hear the sound you wish to store, e.g., the B in Ball. Consonants are usually two parts long and vowels four parts long. If in doubt make consonants longer and vowels shorter.

To store a sound press S. You should input the limits you found to be the best and give it a single *letter* name. If storing a sound like P at the end of a word — as in help — store only the actual noise and not the silence which preceeds it, as this can be added later and is a waste of valuable memory. To delete a stored phoneme at any time, press D.

When you have stored all the sounds you want from a particular word in memory, press T to input another word — to get more sounds from — or, alternatively, press V to synthesize some speech.

Figure 1. IN.



The string input should consist of sets of named phonemes to make the words up. Separate the words by spaces — to generate the sound and to make a long delay — and you can use the numbers 1 to 9 to make short, timed delays at any point.

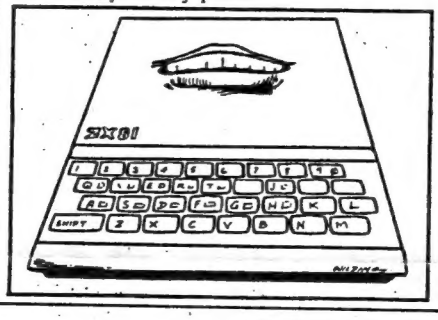
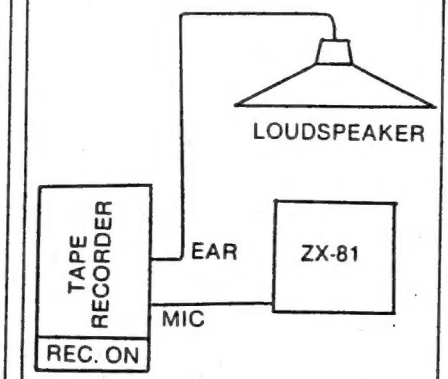


Figure 2. OUT.



Example answers to the synthesis input:
"FLS SWIM QICLIF" — 'eels swim quickly'
"HW NW BRWN CW" — 'how now brown cow'
"TEL MF HF TIM PLFZ" — 'tell me the time please'
"CELIP IS SLJM1F" — 'kelp is slimy'

Note the repetition of sounds to save memory, the use of E and F as soft and hard E, and the use of 1 as a short delay. If a word overruns the memory a tone is generated.

From these basic principles large, complex words and phrases can be synthesized, within the confines of the memory. For example, using the fact that A, B, C, D etc. end in "ee", it can even say a large part of the alphabet, if correctly programmed.

This program does all it can with the RAM available, but is still very limited. Nevertheless, it gives a good demonstration of what can be done on a small microcomputer.

Machine code.

```
16514   33   0   104   6   8
16519   219  254 254   255 32
16524   2    203 254   203 62
16529   16   244 203   14  35
16534   124  254 128   32  234
16539   201  33  0     104 6
16544   8    203 70    40  4
16549   62   0   211   255 0
16554   0    219 254   203 6
16559   16   240 203   6   35
16564   124  254 128   32  230
16569   201  42  16    64  1
16574   5    0   9     17  0
16579   104  35  70    120 254
16584   12   200 229   254 0
16589   32   25  122   50  182
16594   64   205 156   64  62
16599   160  6   0     42  0
16604   0    42  0     0   16
16609   248  61  32    243 225
16614   24   217 254   29  56
16619   20   254 38    48  16
16624   214  28  71    14  0
16629   11   98  107   19  54
16634   0    237 176   225 24
16639   196  33  227   65  6
16644   15   78  185   40  7
16649   35   35  35    16  247
16654   225  201 35    35  70
16659   14   0   43    102 46
16664   0    237 176   225 24
16669   166  0   0     0   227
16674   65   77  14    0   58
16679   31   65  71    58  35
16684   65   128 38    105 188
16689   6    1   208   237 91
16694   33   65  33    16  66
16699   167  237 82    6   2
16704   200  33  30    65  237
16709   160  58  35    65  18
16714   19   237 160   237 83
16719   33   65  27    26  71
16724   14   0   102   46  0
16729   27   25  87    30  0
16734   237  176 122   50  35
16739   65   201 17    3   0
16744   58   30  65    33  227
16749   65   6   15    190 25
16754   40   3   16    250 201
16759   62   70  190   40  83
16764   235  42  33    65  167
16769   237  82  229   213 17
16774   3    0   6     0   4
16779   167  237 82    32  250
16784   225  229 35    78  58
16789   35   65  145   197 71
16794   167  237 82    86  97
16799   14   0   89    107 237
16804   176  122 50    35  65
16809   193  225 43    78  84
16814   93   35  27    27  241
16819   197  245 193   0   0
16824   0    213 237   176 237
16829   83   33  65    209 193
16834   19   26  145   18  19
16839   19   16  248   62  70
16844   18   4   201   167 237
16849   82   119 34    33  65
16854   35   35  78    58  35
16859   65   145 50    35  65
16864   6    1   201
```